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Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of: O'Connor, et al.

Examiner: unknown

Original Patent No. 5,966,286

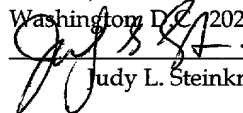
Art Unit: unknown

Original Patent Issue Date: 10/12/99

For: COOLING SYSTEM FOR THIN
PROFILE ELECTRONIC AND
COMPUTER DEVICES

CERTIFICATE OF MAILING

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Judy L. Steinkraus

Commissioner For Patents
Washington, D.C. 20231-0001

REISSUE APPLICATION

Sir:

Applicants respectfully request entry of the following amended as
follows:

IN THE CLAIMS:

Please add the following claims:

(New) 20. An apparatus comprising:

a heat pipe comprising an evaporator portion and a condenser portion, said heat pipe to be coupled to a heat generating component at the evaporator portion of the heat pipe;

an air duct comprising a housing, said air duct directing an air flow from an inlet port to an exit port, said air duct coupled to the condenser portion of said heat pipe; and

an air flow generator coupled to said inlet port to produce the air flow.

(New) 21. The apparatus of claim 20 wherein said heat generating component is an integrated circuit.

(New) 22. The apparatus of claim 20 wherein said housing comprises a first plate and a second plate having respective first and second internal surfaces, said first internal surface having a first array of protruding members that constitute internal fins.

(New) 23. The apparatus of claim 20 wherein said housing comprises a first plate and a second plate having respective first and second internal surfaces, said first internal surface having a first array of protruding members, said second internal surface having a second array of protruding members wherein said first and second array of protruding members constitute internal fins.

(New) 24. The apparatus of claim 20 wherein said housing comprises a material having a high thermal conductivity.

(New) 25. The apparatus of claim 20 wherein said housing comprises aluminum.

(New) 26. The apparatus of claim 20 wherein said air flow generator is a fan.

(New) 27. The apparatus of claim 20 wherein said air flow generator is a resonate

cantilever vibrator.

(New) 28. A heat exchanger comprising:

an air duct having a housing including an inlet port and an exit port;

an air flow generator coupled to the inlet port to produce an air flow, the air flow being directed from the inlet port to the exit port;

a heat pipe having an evaporator portion and a condenser portion, the evaporator portion to be coupled to an integrated circuit package, and the condenser portion being coupled to the air duct.

(New) 29. The heat exchanger of claim 28 wherein the air duct includes fins protruding along an internal surface.

(New) 30. The heat exchanger of claim 29 wherein the fins include a first and second array of protuberances integrally formed along first and second internal surfaces, respectively.

(New) 31. The heat exchanger of claim 28 wherein the air duct includes a material having a high thermal conductivity.

(New) 32. The heat exchanger of claim 28 wherein the air duct comprises aluminum.

(New) 33. The heat exchanger of claim 28 wherein the air flow generator is a fan.

(New) 34. The heat exchanger of claim 28 wherein the air flow generator is a resonate cantilever vibrator.

(New) 35. A system comprising:

an air duct housing having an inlet port and an exit port;

an air flow generator coupled to the inlet port to produce an air flow; and

heat pipe coupling a heat generating component to the air duct housing.

(New) 36. A method comprising :

thermally coupling a heat generating component to a housing of an air duct;

thermally coupling the component to an evaporator portion of a heat pipe, and
thermally coupling a condenser portion of the heat pipe to the air duct housing; and

producing an air flow through the air duct by directing air external to into an inlet
port located the air duct and splitting said air flow into a first air flow and a second air
flow, said first air flow being directed to a first exit port, said second air flow being
directed to a second exit port.

(New) 37. An apparatus comprising:

a heat pipe to be coupled to a heat generating component;

an air duct comprising a housing having internal fins, said air duct directing an air
flow from an inlet port to first and second exit ports located at opposite end portions of
said air duct, the housing coupled to the heat pipe; and

an air flow generator coupled to the inlet port to produce air flow.

(New) 38. The apparatus of claim 37 wherein the heat generating component is an
integrated circuit.

(New) 39. The apparatus of claim 36 wherein the housing includes a first plate and a
second plate having respective first and second internal surfaces, the first internal surface
having a first array of protruding members that constitute internal fins.

(New) 40. The apparatus of claim 36 wherein the housing includes a first plate and a
second plate having respective first and second internal surfaces, the first internal surface
having a first array of protruding members, the second internal surface having a second
array of protruding members wherein the first and second array of protruding members
constitute internal fins.

(New) 41. The apparatus of claim 36 wherein the housing includes a material having a
high thermal conductivity.

(New) 42. The apparatus of claim 36 wherein the housing comprises aluminum.

(New) 43. The apparatus of claim 36 wherein the air flow generator is a fan.

(New) 44. The apparatus of claim 36 wherein the air flow generator is a resonate cantilever vibrator.

(New) 45. A heat exchanger comprising comprising:

an air duct having an inlet port and first and second exit ports disposed at respective opposite first and second end portions of said duct; and

an air flow generator coupled to said inlet port to produce a first and a second air flow, said first air flow being directed from said inlet port to said first exit port, said second air flow being directed from said inlet port to said second exit port;

a heat pipe coupled to the housing of the air duct.

(New) 46. The heat exchanger of claim 45 wherein the air duct include fins protruding along a first internal surface.

(New) 47. The heat exchanger of claim 45 wherein the housing comprises a material having a high thermal conductivity.

(New) 48. The heat exchanger of claim 45 wherein the housing comprises aluminum.

(New) 49. The heat exchanger of claim 45 wherein the air flow generator is a fan.

(New) 50. The heat exchanger of claim 45 wherein the air flow generator is a resonate cantilever vibrator.

(New) 51. A system comprising:

an enclosure having an air duct having an inlet port, and first and second exit ports located adjacent opposite end portions of said air duct;

an air flow generator coupled to said inlet port to produce air flow; and

a heat transfer unit thermally coupled to a heat generating component.

(New) 52. A method comprising:

thermally coupling a heat generating component to an air duct;

thermally coupling the component to a heat pipe, and thermally coupling the heat pipe to the air duct; and

producing an air flow through the air duct by directing air external to the air duct into an inlet port and splitting the air flow into a first air flow and a second air flow, said first air flow being directed to a first exit port located at a first end portion of said air duct, said second air flow being directed to a second exit port located at a second end portion of said air duct.

REMARKS

Error

Claims 1-19 contains excess limitations not necessary for patentability. For example, the claim contains excess limitations not necessary for distinguishing over the prior art. Also, the claim fails to cover embodiments of the invention as claimed in the above-identified reissue application. The error arose during the drafting of the original application and during subsequent amendments in connection with the prosecution of the original application which resulted in the issuance of the patent. Applicants' attorneys thought that only certain claims should be pursued based on what is now believed to be a misunderstanding of the area of the law pertaining to implied licenses and patent exhaustion, and thus limited the claims as indicated above. The error arose without any deceptive intention on the part of the inventors.

Status of Claims under 37 CFR 1.173c

Claims 1-19 stand as issued claims and remain in their unamended state.

Claims 20- 52 are newly presented claims for examination.

Explanation of support under 37 CFR 1.173c

Support for applicants' newly presented claims is readily found in the patent specification, by way of example, in column 2, line 55 – column 6 line 20, figures 1 through 9, and in claims 1-19 as originally issued.

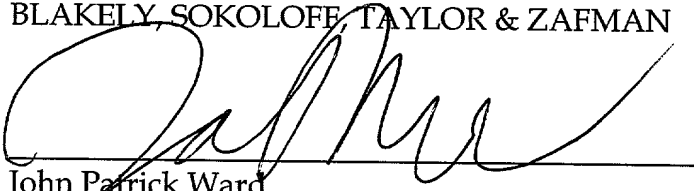
Conclusion

Applicants respectfully submit that these new claims do not add new matter and that all claims now pending are in condition for allowance. If the Examiner believes a telephone conference would expedite or assist in the allowance of the present application, the Examiner is invited to call John Ward at (408) 720-8300, x237.

Authorization is hereby given to charge our Deposit Account No. 02-2666 for any charges that may be due.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN



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Date: October 11, 2001

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